

• High order thinking level question

• Class-9

• Subject-Mathematics

• Chapter-Number system and polynomial

. 1. Every whole number is a natural number write true or false.

2. If  $x = \frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}}$  and  $y = \frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}$ , find the value of  $x^2 + y^2 + xy$ .

3. If  $x = \frac{2-\sqrt{5}}{2+\sqrt{5}}$  and  $y = \frac{2+\sqrt{5}}{2-\sqrt{5}}$ , find the value of  $x^2 - y^2$ .

4. Determine rational numbers p and q if

$$\frac{7+\sqrt{5}}{7-\sqrt{5}} - \frac{7-\sqrt{5}}{7+\sqrt{5}} = p - 7\sqrt{5}q.$$

5. Simplify:  $\frac{6}{2\sqrt{3}-\sqrt{6}} + \frac{\sqrt{6}}{\sqrt{3}+\sqrt{2}} - \frac{4\sqrt{3}}{\sqrt{6}-\sqrt{2}}$

6. Simplify:  $\frac{3\sqrt{2}}{\sqrt{6}-\sqrt{3}} + \frac{2\sqrt{3}}{\sqrt{6}+2} - \frac{4\sqrt{3}}{\sqrt{6}-\sqrt{2}}$

7. Show that:  $\frac{1}{3-\sqrt{8}} - \frac{1}{\sqrt{8}-\sqrt{7}} + \frac{1}{\sqrt{7}-\sqrt{6}} - \frac{1}{\sqrt{6}-\sqrt{5}} + \frac{1}{\sqrt{5}-2} = 5$

8. If:  $x = \frac{\sqrt{p+q} + \sqrt{p-q}}{\sqrt{p+q} - \sqrt{p-q}}$ , then find the value of  $qx^2 - 2px + q$ .

9. Show that:  $\frac{x^{-1}+y^{-1}}{x^{-1}} + \frac{x^{-1}-y^{-1}}{x^{-1}} = \frac{x^2+y^2}{xy}$

10. If  $2^a = 3^b = 6^c$  then show that  $c = \frac{ab}{a+b}$ .

11. If  $x = 2 + 3\sqrt{2}$ , then find the value of  $\left(x + \frac{14}{x}\right)$ .

## Answers

1. False	2. 99	3. $-144\sqrt{5}$	4. $p = 0, q = -\frac{1}{11}$
5. 0	6. 0	8. 0	11. $6\sqrt{2}$

**12. Factorise:**  $(a - b)^3 + (b - c)^3 + (c - a)^3$

**13. Find the product:**  $(x - 3y)(x + 3y)(x^2 + 9y^2)$

**14. If  $x^2 - 3x + 2$  divides  $x^3 - 6x^2 + ax + b$  exactly, then find the value of 'a' and 'b'**